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SUMMARY OF WATER QUALITY STANDARDS FOR THE INTERSTATE WATERS OF KANSAS

Environmental Protection Agency
Washington, D. C.

April 1972

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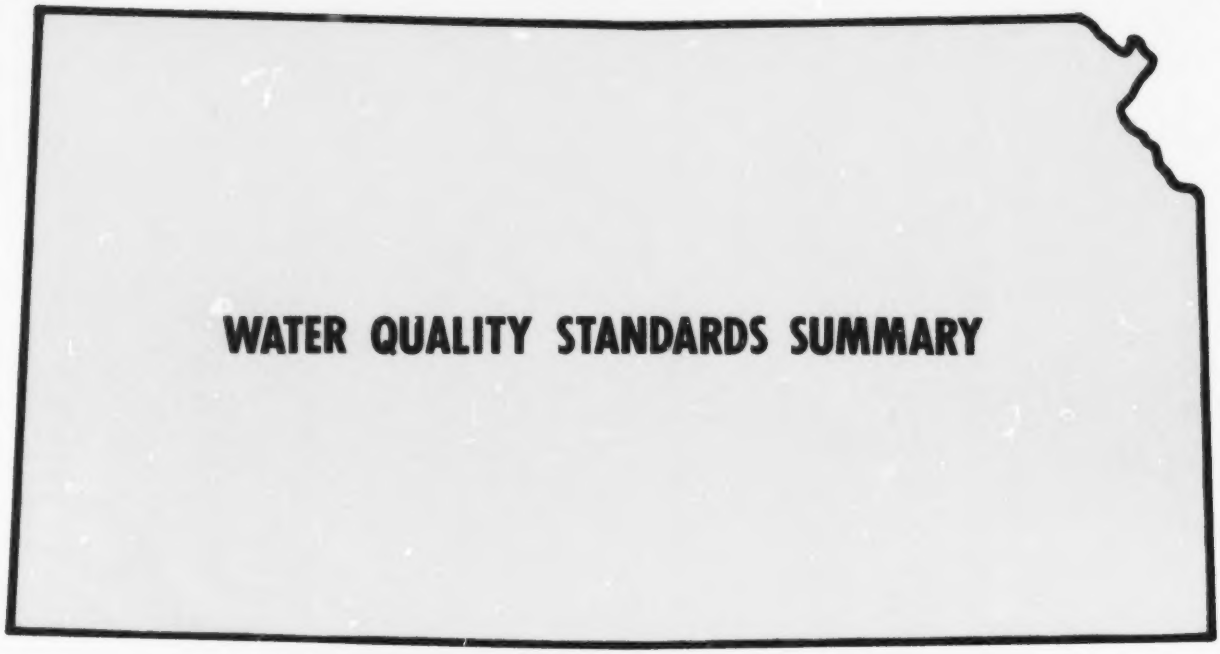
KANSAS



WATER QUALITY STANDARDS SUMMARY

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APRIL 1972

U.S. ENVIRONMENTAL PROTECTION AGENCY

KANSAS STATE BOARD OF HEALTH
KANSAS STATE DEPARTMENT OF HEALTH

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PREFACE

This summary is intended for use by those who have an interest in the water quality standards of the State of Kansas.

The information contained herein has been condensed from the documents entitled "River Basin Water Quality Criteria, Kansas," and "Plan of Implementation for Water Quality Control and Pollution Abatement, Kansas," dated June 1967, and subsequent amendments of January 14, 1969, and January 8, 1971, adopted by the Kansas State Board of Health.

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SUMMARY

WATER QUALITY STANDARDS FOR THE INTERSTATE WATERS OF KANSAS

Introduction

In the Water Quality Act of 1965, Congress authorized the establishment of water quality standards for interstate (including coastal) waters. The purpose of these standards is to protect and enhance the quality and productivity of the Nation's interstate waters to serve a variety of beneficial uses, such as public water supply, recreation and protection of aquatic life, and industrial and agricultural uses. This publication summarizes the standards for the general information of the American public and Federal, State and local officials as to the uses and associated requirements for interstate waterways.

The Act, which amended the Federal Water Pollution Control Act, provided for the States to have the first opportunity to establish standards for their interstate waters, which were then subject to review and approval by the Secretary of the Interior.* All of the States, the District of Columbia, and the Territories of Guam, Puerto Rico and the Virgin Islands participated in this landmark effort to set standards. In the course of establishing the standards, public hearings were held by the States and other jurisdictions noted above to give the public an opportunity to participate in setting water quality objectives and standards.

Kansas adopted standards for its interstate waters on May 31, 1967, which were then submitted to the Department of the Interior. Subsequently, certain revisions were made by the State in the original standards, and the Secretary of the Interior approved the standards, as revised, on April 25, 1969, with certain exceptions. Further revisions of the water quality standards were adopted by

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*Effective December 2, 1970, the Administrator of the Environmental Protection Agency.

the Kansas State Board of Health on January 8, 1971, and were approved, as amended, on March 5, 1971, by the Administrator of the Environmental Protection Agency.

At the request of the Secretary of the Interior, Kansas adopted a policy to protect its high quality interstate waters. This policy statement was approved by the Secretary of the Interior on April 25, 1969.

The approved standards are both State and Federal standards, enforceable under the State water pollution control statutes and the Federal Water Pollution Control Act, as amended (Section 10). The waters for which standards were adopted are shown on the map in Figure 1, page 4.

The standards consist of three major components: designation of the uses which interstate waters are to serve, specification of narrative and numerical criteria to protect and enhance water quality, and specification of a plan of implementation and enforcement, which includes treatment and control requirements for municipal, industrial and other wastes discharged to or affecting interstate waters. These components are discussed in the following sections. All three are essential to a complete standards program.

The standards are now being implemented. However, there will be continuing research on water quality requirements for various beneficial uses and improved collection and evaluation of water quality data. As more information becomes available and experience with implementing the standards is gained, the standards will be refined and improved to reflect this new knowledge.

Should more detailed information be required on any aspect of the standards, it may be obtained from the Kansas State Department of Health or the Environmental Protection Agency Regional Office in Kansas City, Missouri. Kansas has also established water quality standards for its intrastate waters, and information on these standards may also be obtained from the Kansas State Department of Health. The addresses of these offices are shown on page 31.

Other agencies of the State of Kansas which have authority for water pollution control activities are:

Kansas Forestry, Fish and Game Commission	Preservation of fish and wildlife.
Kansas Geological Survey	Oil field wastes.
	Irrigation return flows.

Kansas State Department of Agriculture	Soil erosion.
	Silt control.
Kansas State Corporation Commission	Oil field wastes.
Kansas Water Resources Board	Oil field wastes.
	Irrigation return flows.
	Sampling and analysis of sediment in streams.

The addresses of these offices are also given on page 31.

KANSAS INTERSTATE WATERS

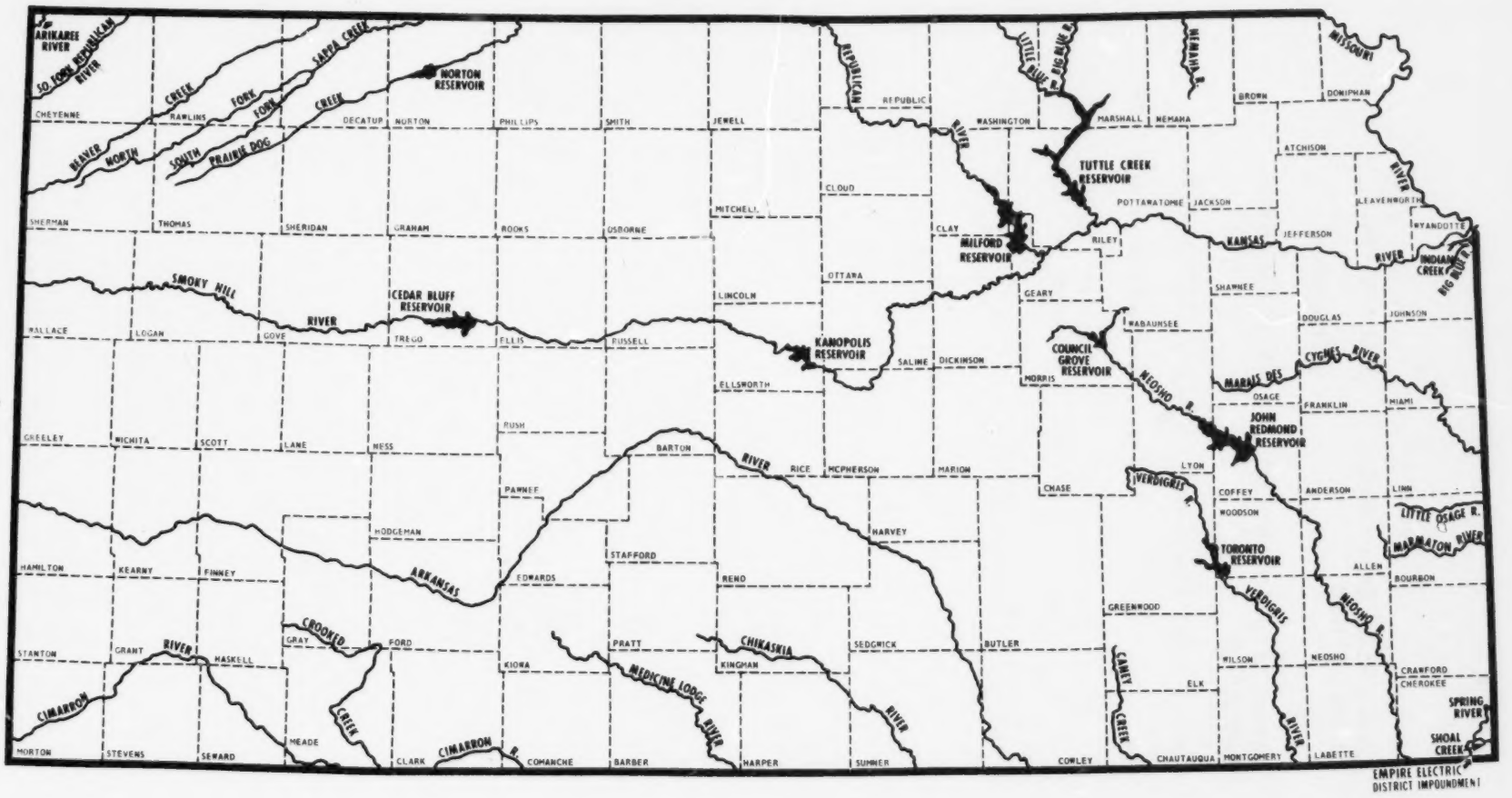


Figure 1

WATER USES

The State of Kansas designates the following uses to be protected in various interstate waters:

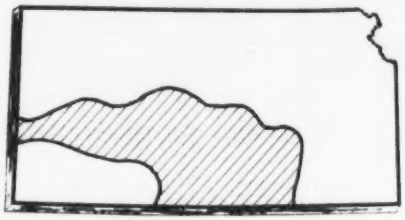
- Public Water Supply
- Industrial Water Supply
- Body Contact Recreation
- Limited Recreation
- Recreation Including Sport Fishing
- Agricultural Purposes
- Receive Treated Wastes
- Commercial Fishing

The general aim in designating uses for particular interstate waters is to recognize present uses and practicable future uses, to provide where possible for a variety of uses, and to assure compatibility of standards with Federal, State and local resource planning. In order to satisfy the intent of the Federal Water Pollution Control Act to enhance water quality, the standards specifically provide that no interstate waters may be used solely or primarily for waste assimilation. All interstate waters must be aesthetically pleasing, and this quality is usually protected by narrative criteria preventing unsightly or obnoxious conditions, such as floating debris, oil slicks, and unpleasant odors and colors.

Specific use designations for all interstate waters covered by the standards are provided in Figures 2-11, pages 6-15.

FIGURE 2

INTERSTATE WATERS AND DESIGNATED USES



INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)									
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING		
ARKANSAS RIVER BASIN										
Arkansas River--Colorado-Kansas State line to Kansas-Oklahoma State line.		X			X	X	X			
Chikaskia River--Headwaters to Kansas-Oklahoma State line.	X	X			X	X	X			
Medicine Lodge River--Headwaters to Kansas-Oklahoma State line.					X	X	X			

FIGURE 3

INTERSTATE WATERS AND DESIGNATED USES

INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING
BIG BLUE RIVER BASIN								
Big Blue River--Nebraska-Kansas State line to confluence with Kansas River.	X	X			X	X	X	
Little Blue River--Nebraska-Kansas State line to confluence with Big Blue River.					X	X	X	
Tuttle Creek Reservoir--Impounds waters of Big Blue River.	X	X	X		X	X	X	

FIGURE 4

INTERSTATE WATERS AND DESIGNATED USES

INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING
CIMARRON RIVER BASIN								
Cimarron River--Colorado-Kansas State line to Kansas-Oklahoma State line.					X	X		
Crooked Creek--Headwaters to Kansas-Oklahoma State line.					X	X	X	

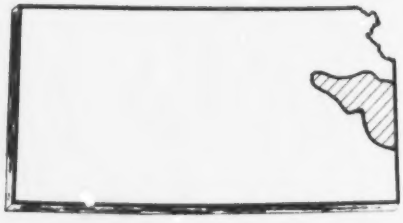
FIGURE 5

INTERSTATE WATERS AND DESIGNATED USES

INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING
KANSAS RIVER BASIN								
Kansas River--Junction of Republican and Smoky Hill Rivers to confluence with Missouri River.	X	X			X	X	X		

FIGURE 6

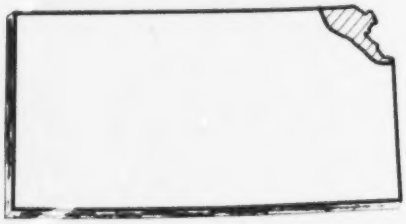
INTERSTATE WATERS AND DESIGNATED USES



INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING
MARAIS DES CYGNES RIVER BASIN								
Little Osage River--Headwaters to Kansas-Missouri State line.					X	X		
Marais des Cygnes River--Headwaters to Kansas-Missouri State line.	X	X			X	X	X	
Marmaton River--Headwaters to Kansas-Missouri State line.					X	X	X	

FIGURE 7

INTERSTATE WATERS AND DESIGNATED USES



INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING
MISSOURI RIVER BASIN								
Big Blue River--Headwaters to Kansas-Missouri State line.					X	X		
Indian Creek--Headwaters to Kansas-Missouri State line.				X			X	
Missouri River--Nebraska-Kansas State line to mouth of Kansas River.	X	X			X	X	X	X
Nemaha River--Headwaters to Kansas-Nebraska State line.					X	X	X	

FIGURE 8

INTERSTATE WATERS AND DESIGNATED USES

INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING	
NEOSHO RIVER BASIN									
Council Grove Reservoir--Impounds waters of Neosho River.	X	X	X		X	X	X		
Empire Electric District Impoundment--Impounds waters of Spring River.		X	X		X	X	X		
John Redmond Reservoir--Impounds waters of Neosho River.	X	X	X		X	X	X		
Neosho River--Headwaters to Kansas-Oklahoma State line.	X	X			X	X	X		
Shoal Creek--Missouri-Kansas State line to confluence with Spring River.		X			X	X			
Spring River--Missouri-Kansas State line to Kansas-Oklahoma State line.		X			X	X	X		

FIGURE 9

INTERSTATE WATERS AND DESIGNATED USES

INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING	
REPUBLICAN RIVER BASIN									
Arikaree River--Colorado-Kansas State line to Kansas-Nebraska State line.					X	X			
Beaver Creek--Headwaters to Kansas-Nebraska State line.					X	X	X		
Milford Reservoir--Impounds waters of Republican River.	X	X	X		X	X	X		
Norton Reservoir--Impounds waters of Prairie Dog Creek.			X		X	X	X		
Prairie Dog Creek--Headwaters to Kansas-Nebraska State line.					X	X	X		
Republican River--Nebraska-Kansas State line to confluence with Kansas River.	X	X			X	X	X		
Sappa Creek--Headwaters to Kansas-Nebraska State line.					X	X	X		
South Fork Republican River--Colorado-Kansas State line to Kansas-Nebraska State line.					X	X	X		

FIGURE 10

INTERSTATE WATERS AND DESIGNATED USES

INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING
SMOKY HILL RIVER BASIN								
Cedar Bluff Reservoir--Impounds waters of Smoky Hill River.	X	X	X		X	X	X	
Kanopolis Reservoir--Impounds waters of Smoky Hill River.	X	X	X		X	X	X	
Smoky Hill River--Colorado-Kansas State line to headwaters of Cedar Bluff Reservoir.					X	X	X	
Smoky Hill River--Below Cedar Bluff Reservoir to confluence with Kansas River.	X	X			X	X	X	

FIGURE 11

INTERSTATE WATERS AND DESIGNATED USES

INTERSTATE WATERS	DESIGNATED USES (PRESENT AND FUTURE)								
	PUBLIC WATER SUPPLY	INDUSTRIAL WATER SUPPLY	BODY CONTACT RECREATION	LIMITED RECREATION	RECREATION INCLUDING SPORT FISHING	AGRICULTURAL PURPOSES	RECEIVE TREATED WASTES	COMMERCIAL FISHING	
VERDIGRIS RIVER BASIN									
Caney River--Headwaters to Kansas-Oklahoma State line.	X	X			X	X	X		
Toronto Reservoir--Impounds waters of Verdigris River.	X	X	X		X	X	X		
Verdigris River--Headwaters to Kansas-Oklahoma State line.	X	X			X	X	X		

WATER QUALITY CRITERIA

The protection of water quality and uses requires the establishment of numerical and narrative limits on pollutants which damage these uses. The water quality criteria in this section reflect the best scientific judgment available as to the water quality requirements for the assigned uses. Numerical criteria are used wherever it is reasonable to do so. However, narrative criteria are also necessary in some cases, particularly with respect to aesthetic considerations.

Some interstate waters have a higher quality than the minimum levels assigned for protection of water uses, and the standards seek to protect this higher quality as much as possible in the face of increasing social and economic development. Scientific knowledge about the exact water quality requirements for uses is limited; and by preventing degradation of high quality waters, the standards seek to assure optimum, not marginal, conditions to protect the uses associated with clean waters.

Water quality criteria for various interstate waters protected by the Kansas Water Quality Standards are shown on pages 19-23. In addition, the Standards contain general narrative criteria, including a statement on controlling degradation of high quality waters, which are shown on pages 17-18.

GENERAL WATER QUALITY CRITERIA - MINIMUM CONDITIONS

Arkansas River
Big Blue River (Big Blue River Basin)
Cedar Bluff Reservoir
Cimarron River
Council Grove Reservoir
Empire Electric District Impoundment
John Redmond Reservoir
Kanopolis Reservoir
Kansas River
Little Blue River
Marais des Cygnes River
Milford Reservoir
Missouri River
Neosho River
Republican River
Shoal Creek
Smoky Hill River (below Cedar Bluff Reservoir)
Spring River
Toronto Reservoir
Tuttle Creek Reservoir
Verdigris River

The cumulative effect of waste discharges to the rivers (creeks) (reservoirs) will be guided by the 1962 U.S. Public Health Service Drinking Water Standards except that for substances toxic to fish, standards generally accepted for fishery environment will be considered. Pollutional substances will be maintained below maximum permissible concentrations which would be detrimental for public water supplies, recreation requirements including sport fishing, agricultural needs, industrial needs, and other established beneficial use.

- - -

Arikaree River
Beaver Creek
Caney River
Chikaskia River
Crooked Creek
Little Osage River
Marmaton River
Medicine Lodge River
Norton Reservoir
Prairie Dog Creek
Sappa Creek
Smoky Hill River (above Cedar Bluff Reservoir)
South Fork Republican River

The cumulative effect of waste discharges to the rivers (creeks) will be guided by the 1962 U.S. Public Health Service Drinking Water Standards except that for substances toxic to fish, standards generally accepted for fishery environment will be considered. Pollutional substances will be maintained below maximum permissible concentrations which would be detrimental for public water supplies, recreation requirements including sport fishing, agricultural needs, industrial needs, and other

established beneficial use. The above-named streams shall be controlled so that public health hazards or nuisance conditions will not develop due to man-made discharges.

Standard Regarding Maintenance of High Quality Waters:

All waters of the State, whose existing quality is better than the applicable water quality standards as established by the State of Kansas as of the date the water quality standards become effective will not be lowered in quality until it has been determined by the Kansas State Board of Health that the change is justifiable as a result of necessary social and economic development and that all the beneficial uses of waters affected will not be impaired. In no case shall the quality of waters of the State be reduced below the quality standards as established by the State of Kansas.

Any industrial, public, or private project or development which would constitute a new or increased source of pollution to high quality waters will be required to provide the best practicable degree of treatment available under existing technology.

The Kansas State Board of Health will furnish reports and information to the U.S. Department of the Interior* as the Secretary of the Interior** may need to carry out his functions under the Water Quality Act of 1965.

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*Effective December 2, 1970, U.S. Environmental Protection Agency.

**Effective December 2, 1970, Administrator of the U.S. Environmental Protection Agency.

SPECIFIC WATER QUALITY CRITERIA

BACTERIA

The following criteria apply to all interstate waters of Kansas:

1. In waters designated for public water supply, the fecal coliform content shall not exceed 2,000 per 100 ml sample.

2. In waters designated for body contact recreation, the fecal coliform content based on a minimum of not more than a 30-day period shall not exceed a log mean of 200 per 100 ml sample, nor shall more than 10 percent of total samples during any 30-day period exceed 400 per 100 ml sample.

3. In waters designated for recreation including sport fishing, the fecal coliform content shall not exceed 2,000 per 100 ml sample.

DISSOLVED OXYGEN

Big Blue River (Big Blue River Basin)
Cedar Bluff Reservoir
Empire Electric District Impoundment
Kanopolis Reservoir
Kansas River
Little Blue River
Marais des Cygnes River
Milford Reservoir
Missouri River
Republican River
Shoal Creek
Smoky Hill River (below Cedar Bluff Reservoir)
Spring River
Toronto Reservoir
Tuttle Creek Reservoir
Verdigris River

The dissolved oxygen of the rivers (creeks) (reservoirs) shall be maintained at or above 5 mg/l. Dissolved oxygen concentrations less than 5 mg/l shall not be due to man-made waste discharges.

- - -

Arkansas River
Cimarron River

The dissolved oxygen of the river shall be maintained at or above 4 mg/l. Dissolved oxygen concentrations less than 4 mg/l shall not be due to man-made waste discharges.

- - -

DISSOLVED OXYGEN (cont'd.)

Council Grove Reservoir | John Redmond Reservoir | Neosho River

Above the headwaters of John Redmond Reservoir the dissolved oxygen of the river shall be maintained at or above 4 mg/l. Below the headwaters of John Redmond Reservoir the dissolved oxygen of the river shall be maintained at or above 5 mg/l. Dissolved oxygen concentrations less than 4 mg/l and 5 mg/l for the respective reaches shall not be due to man-made waste discharges.

TEMPERATURE

The following criteria apply to all interstate waters of Kansas:

Waste discharges shall not elevate the temperature of the river (creek) (reservoir) above 90° F. Heat of artificial origin shall not be added to a stream in excess of the amount that will raise the temperature of the water more than 5° F above natural conditions. The epilimnion of lakes shall not be raised more than 3° F above that temperature which existed before the addition of heat of artificial origin. The normal daily and seasonal temperature variations before the addition of heat due to other than natural causes should be maintained. The measurement system to be used in each case should provide for temperature measurements at the outfall and with the maximum temperature allowed at the outfall reflecting a reasonable mixing zone in the receiving waters so that the 5° F or 3° F rise specified is not violated in the contiguous receiving waters. Any barrier to migration and the free movement of the aquatic biota is prohibited.

HYDROGEN ION POTENTIAL

Arkansas River

Waste discharge shall not cause the pH of the river to vary below 6.5 nor above 9.0.

- - -

All other interstate waters of Kansas:

Waste discharge shall not cause the pH of the river to vary below 6.5 nor above 8.5.

OIL AND GREASE

The following criteria apply to all interstate waters of Kansas:

The river (receiving stream) shall be essentially free of visible oil and grease. Dissolved or emulsified grease concentrations shall be kept below levels which will interfere with established beneficial use.

SOLIDS

The following criteria apply to all interstate waters of Kansas:

There shall be no man-made deposits of solids in the river (creek) (reservoir), either organic or inorganic, which will be detrimental to established beneficial use.

\- - -

Arikaree River
Arkansas River
Beaver Creek
Big Blue River (Big Blue River Basin)
Big Blue River (Missouri River Basin)
Caney River
Cedar Bluff Reservoir
Chikaskia River
Cimarron River
Council Grove Reservoir
Crooked Creek
Empire Electric District Impoundment
John Redmond Reservoir
Kanopolis Reservoir
Kansas River
Little Blue River
Marais des Cygnes River
Medicine Lodge River
Milford Reservoir
Nemaha River
Neosho River
Norton Reservoir
Prairie Dog Creek
Republican River
Sappa Creek
Shoal Creek
Smoky Hill River (above Cedar Bluff Reservoir)
South Fork Republican River
Spring River
Tuttle Creek Reservoir

The river (creek) (reservoir) shall be free of floating debris, scum, and other floating materials attributable to municipal, industrial, or other waste disposal practices in amounts sufficient to be unsightly or detrimental to established beneficial use.

TURBIDITY

Arkansas River
Big Blue River (Big Blue River Basin)
Cedar Bluff Reservoir
Cimarron River
Council Grove Reservoir
Empire Electric District Impoundment
John Redmond Reservoir
Kanopolis Reservoir
Kansas River
Little Blue River
Marais des Cygnes River
Milford Reservoir
Missouri River
Neosho River
Republican River
Shoal Creek
Smoky Hill River (below Cedar Bluff Reservoir)
Spring River
Toronto Reservoir
Tuttle Creek Reservoir
Verdigris River

There shall be no turbidity increase, of other than natural origin, that will cause substantial visible contrast with the natural appearance of the river (creek) (reservoir) or be detrimental to established beneficial use.

- - -

Arikaree River
Beaver Creek
Big Blue River (Missouri River Basin)
Caney River
Chikaskia River
Crooked Creek
Indian Creek
Little Osage River
Marmaton River
Medicine Lodge River
Nemaha River
Norton Reservoir
Prairie Dog Creek
Sappa Creek
Smoky Hill River (above Cedar Bluff Reservoir)
South Fork Republican River

There shall be no turbidity increase of other than natural origin that will preclude other beneficial use.

TASTE AND ODOR PRODUCING SUBSTANCES

The following criteria apply to all interstate waters of Kansas:

Taste and odor producing substances from man-made sources shall be limited to concentrations in the river (creek) (reservoir) that will not interfere with the production of potable water by reasonable water treatment processes or impart unpalatable flavor to fish, or result in noticeable offensive odors in the vicinity of the water, or otherwise interfere with established beneficial use of the river (creek) (reservoir).

COLOR

Arkansas River
Big Blue River (Big Blue River Basin)
Big Blue River (Missouri River Basin)
Caney River
Cedar Bluff Reservoir
Chikaskia River
Cimarron River
Council Grove Reservoir
Crooked Creek
Empire Electric District Impoundment
Indian Creek
John Redmond Reservoir
Kanopolis Reservoir
Kansas River
Little Blue River
Little Osage River
Marais des Cygnes River
Marmaton River
Medicine Lodge River
Milford Reservoir
Missouri River
Nemaha River
Neosho River
Republican River
Shoal Creek
Smoky Hill River
Spring River
Toronto Reservoir
Tuttle Creek Reservoir
Verdigris River

Man-made discharges of color producing substances shall be limited to concentrations which will not be detrimental to established beneficial use.

IMPLEMENTATION PLAN

The "action" plan of the standards is the plan of implementation and enforcement. This plan sets forth the requirements for treatment and/or control of all conventional municipal and industrial waste discharges in the State which affect interstate waters, specifies the time within which this is to be accomplished, and contains programs for dealing with other water pollution control problems. In general, the standards call for installation of secondary treatment or the equivalent, or higher, to achieve a minimum of 85 percent reduction of the five-day biochemical oxygen demand for all municipal and industrial wastes by December 31, 1975. In addition, continuous disinfection of treated wastes is required for municipalities and industries which contribute bacterial loadings to a river or stream used as a downstream public water supply and which supplies are within the zone of bacterial influence. Seasonal disinfection (April 1 through October 31) of treated wastes shall be provided for those municipalities or industries which contribute bacterial loadings to rivers or streams which are tributary to waters used for body contact recreation and such waters are within the zone of bacterial influence.

Other programs to control and abate pollution are developed in the standards with a plan of action as follows:

1. Oil Field Wastes

   Oil field wastes are a minor problem in Kansas. The Kansas State Corporation Commission and the State Board of Health have regulatory authority in oil field matters. Laws in effect in the State of Kansas give the State Board of Health legislative authority to control surface disposal of wastes from oil field operations.

2. Animal Wastes

   One of the major uncontrolled sources of water pollutants results from the confined feeding of domestic livestock. The Kansas State Board of Health adopted regulations entitled "Agricultural and Related Wastes Control," effective May 31, 1967, which have the effect of law. These regulations give the Kansas State Department of Health the authority to regulate

confined feeding operations of 300 or more animals or an operation using waste ponds or lagoons. Improvement is being made in water quality conditions resulting from animal feedlot wastes.

3. Reservoir Sanitation Zones, Marinas, and Marine Toilets

The Kansas State Department of Health maintains strict control over structures erected within a reservoir sanitation zone. If the sanitary waste facilities violate the law, the owner is subject to court injunctive action.

4. Solid Wastes

The Kansas State Board of Health has adopted and implemented a program to discontinue and eliminate the practice of locating and operating refuse disposal sites in areas which will contribute to degradation of water quality.

5. Soil Erosion and Silt Control

Soil erosion is a problem in Kansas. However, the watershed program conducted by the Soil Conservation Service in the Department of Agriculture in cooperation with local watershed districts has made considerable progress toward coping with this problem.

6. Sand, Gravel and Quarry Operations

Sand, gravel and quarry operations have created nuisance and pollution conditions in some instances. Relatively large quantities of silt and rock dust can be released to rivers and streams to the detriment of fish and other aquatic life. However, nearly all operations which have created water quality problems have been dealt with individually in providing corrective measures.

7. Irrigation Return Flow and Agricultural Chemicals

Irrigation practices have not caused any significant deterioration of water quality. State agencies intend to study the overall water pollution effects of irrigation practices and recommend changes needed to preserve desirable quality of water.

Studies are in progress to determine the movement and residual buildup of pesticides within the Cedar Bluff Irrigation District. The gross effects of general agricultural chemicals on waters of the State will be monitored and corrective action taken where necessary.

8. Nutrient Removal and Control

Growth of algae is common in all streams and lakes in the State due to natural conditions. Also, several possible sources of nutrient materials capable of producing excessive algal growths are present. Research projects under way to remove nutrients from municipal and industrial sewage treatment plant effluents include tertiary ponds which remove the nutrients by the natural ecological cycle, and activated algae treatment which utilizes a controlled algal mass with sludge recycle.

GLOSSARY OF TERMS

Advanced Waste Treatment--Refers to methods and processes that will remove more contaminants from wastewater than are usually removed in present-day conventional treatment plants. The processes may be physical, chemical, biological, or combinations of these. Examples of advanced waste treatment are carbon adsorption, coagulation, reverse osmosis, electrodialysis, and ion exchange.

Bacteria--The best indicator of the sanitary quality of water has been an estimate of the density of coliform bacteria. There are two classifications:

(1) Coliform or total coliform bacteria include a heterogeneous grouping of bacteria which are identified by bacteriological procedures to be gram-negative, non-spore-forming, rod-shaped organisms which will ferment lactose with gas formation within 48 hours at 35° C in either an aerobic or facultative anaerobic environment. Since these bacteria are present in large numbers in fecal wastes, they have been a traditional bacteriological tool used to measure the occurrence and intensity of fecal contamination in stream pollution investigations.

(2) Fecal coliform bacteria are that portion of coliform population which are capable of lactose fermentation at an elevated temperature of 44.5° C. Unlike some strains of nonfecal members of the total coliform group, fecal coliforms have a specific high order of positive correlation with warm-blooded animal pollution, survive for shorter time in water and soil, and more closely correlate with survival patterns of enteric pathogenic bacteria.

Biochemical Oxygen Demand (BOD)--The BOD is the measure of the amount of oxygen necessary to satisfy the biochemical oxidation requirements of organic matter at the time the sample is collected. Unless otherwise specified, this term will mean the 5-day BOD incubated at 20° C. Waste discharges containing high levels of BOD reduce dissolved oxygen concentrations in the receiving waters.

Commercial Fishing--The harvesting of fish primarily for sale.

Disinfection--The killing of the larger portion (but not necessarily all) of the harmful and objectionable microorganisms in, or on, a medium by means of chemicals, heat, ultraviolet light, etc. Disinfection by chlorination is the method most commonly used in sewage treatment processes.

Dissolved Oxygen (D.O.)--The oxygen dissolved as a gas in sewage, water, or other liquid usually expressed in milligrams per liter (mg/l), parts per million (ppm) or percent saturation. Adequate dissolved oxygen levels are necessary in waters to protect fish and other aquatic life and to prevent offensive odors. Low dissolved oxygen concentrations are generally due to the presence of excessive organic material discharged as a result of inadequately treated or controlled waste (having high BOD). Excessive algal growths may cause vastly fluctuating dissolved oxygen levels. Other factors such as temperature, depth of water, and water movement influence dissolved oxygen levels.

Interstate Waters--Under the Federal Water Pollution Control Act, interstate waters are defined as:

(1) rivers, lakes and other waters which flow across or form a part of State or international boundaries;

(2) waters of the Great Lakes;

(3) coastal waters--whose scope has been defined to include ocean water seaward to the territorial limits and waters along the coastline (including inland streams) that are influenced by the rise and fall of the tide.

Intrastate Waters--Rivers, lakes, and other waters wholly within the State, which do not flow across nor form a part of the boundaries of the State.

Membrane Filter (MF)--A technique of bacteriological analysis. This technique involves the running of a certain volume of water through a cellulose ester wafer which is then impregnated with growth media for bacteria.

Milligrams Per Liter (mg/l)--Milligrams of solute per liter of solution. Equivalent to parts per million assuming unit density.

"Most Probable Number" (MPN)--A test of bacterial density expressed as a number of organisms per hundred milliliters. It is a number most likely to occur, using statistical methods, under the given circumstances or conditions of the test.

pH--The index of hydrogen ion activity used to indicate a water being acidic or alkaline in nature. The pH of most natural waters ranges from 6.5 to 8.5. Waters having a pH at these levels are favorable for most surface water uses including all aspects of desirable aquatic life. A pH outside this range is caused, in most cases, by decaying vegetation, inadequately treated industrial wastes, or mine drainage entering the water body.

Pollution--Introduction of substances of such character and in such quantity to a body of water that its natural quality is so altered as to impair its usefulness or render it offensive to the senses of sight, taste, or smell.

Recreation:

Body Contact Recreation--Includes uses of water such as swimming and water skiing.

Limited Recreation--Includes activities listed under "Recreation, Including Sport Fishing," but which may be restricted or not possible during some periods due to low or intermittent stream flows.

Recreation, Including Sport Fishing--Includes uses of water such as boating and fishing.

Sewage*--Any substance that contains any of the waste products or excrementitious or other discharges from the bodies of human beings or animals, or chemical or other wastes from domestic, manufacturing or other forms of industry.

Sewer, Combined--A sewer which carries both sanitary sewage and storm drainage. At times of heavy rainfall, the capacity of combined sewers may be exceeded and sewers will overflow. The overflow will bypass the sewage treatment plant and the combined wastewaters will be discharged directly into streams without treatment of any kind. This is a problem in many older cities in the United States, and there are various programs to deal with it.

Solids, Settleable--Suspended solids which will subside in quiescent water, sewage or other liquid in a reasonable period.

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*As defined by Kansas State statute.

Solids, Suspended--Solids that either float on the surface of, or are in suspension in, water, sewage or other liquids and which are largely removable by laboratory filtering.

Temperature--A measure of the hotness or coldness of water. While temperature is affected by natural conditions, man has a significant effect by the construction and operation of dams and the discharge of cooling waters from industrial processes, particularly power generation.

Toxic Materials--These may include hundreds of compounds present in waters due to industrial wastes, runoff from farm lands where pesticides have been applied, and other materials which are harmful to human, plant, animal and aquatic life.

Treatment, Primary--May be defined as that process or group of processes capable of removing a high percentage of floating and settleable solids. This is the first major treatment in a sewage treatment works, and generally removes from 30 to 65 percent of the 5-day biochemical oxygen demand.

Treatment, Secondary--May be defined as that process or group of processes capable of removing virtually all floating and settleable solids, a minimum of 85 percent of the 5-day biochemical oxygen demand, and a similar level of removal of suspended solids in untreated waste. The equivalent treatment may generally be defined as that process or group of processes achieving maximum practicable removal of solids, oils, grease, acids, alkalis, toxic materials, bacteria, taste and odor-causing materials, color and any other objectionable constituents contained in untreated waste to produce an effluent equivalent to that obtained from secondary treatment facilities in current use for any specific category of industrial waste.

Warm- and Cold-Water Fish--Warm-water fish include black bass, sunfish, catfish, gar and other; cold-water fish include salmon and trout, whitefish, miller's thumb and blackfish. The temperature factor determining distribution is set by adaptation of the eggs to warm or cold water.

FEDERAL AND STATE AGENCY ADDRESSES

State Agencies

Kansas State Department
of Health
Division of Environmental
Health
535 Kansas Avenue
Topeka, Kansas 66603

Kansas Forestry, Fish
and Game Commission
Box F
Pratt, Kansas 67124

Kansas Geological Survey
University of Kansas
Lawrence, Kansas 66044

Kansas State Department
of Agriculture
State Office Building
Topeka, Kansas 66612

Kansas State Corporation
Commission
State Office Building
Topeka, Kansas 66612

Kansas Water Resources
Board
State Office Building
Topeka, Kansas 66612

Federal Agencies

Environmental Protection Agency
Washington, D.C. 20460

Environmental Protection Agency
Region VII
1735 Baltimore
Kansas City, Missouri 64108

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